

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY) 03/24/2004		2. REPORT TYPE Final Technical		3. DATES COVERED (From - To) October 1, 1995 - December 31, 2004	
4. TITLE AND SUBTITLE Curating Geological Collections				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER N00014-96-1-0218	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) James W. Hawkins Annika Sanfilippo				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The Regents of the University of California Scripps Institution of Oceanography, University of California, San Diego 9500 Gilman Drive La Jolla, CA 92093-0210				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office Of Naval Research Ballston Centre Tower One 800 North quincy Street Arlington, VA 22217-5660				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	

12. DISTRIBUTION/AVAILABILITY STATEMENT

Publicly available

13. SUPPLEMENTARY NOTES

20040330 008

14. ABSTRACT

ONR funding was used to accomplish the long-term goals of the Scripps Institution of Oceanography Geological Collections, which have been and continue to be, to serve the scientific community by acquisition, maintenance, conservation and curation of marine geological samples; to make the scientific community aware of our holdings; to encourage utilization of the collection for the scientific study and science educational purposes; to develop consistent policies and procedures through active cooperation with other marine geological repositories; and to support related activities at SIO and the scientific community at large.

15. SUBJECT TERMS

Geological collections
Marine geological samples
Curating

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 22	19a. NAME OF RESPONSIBLE PERSON James W. Hawkins
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code) 858-534-2161

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

Final Report
Award Number: N00014-96-1-0218
Curating SIO Geological Collections

James W. Hawkins

Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA 92093-0220
phone: (858) 534-2161 fax: (858) 534-0784 email: jhawkins@ucsd.edu

Annika Sanfilippo

Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA 92093-0244
phone: (858) 534-2049 fax: (858) 822-3310 email: asanfilippo@ucsd.edu

Award Number: N00014-96-1-0218

<http://gc.ucsd.edu/gc>

<http://gs.ucsd.edu/gc/proc/procFS.html>

<http://gs.ucsd.edu/gc/data/datarch.html>

LONG-TERM GOALS

The long-term goals for the Scripps Institution of Oceanography Geological Collections, have been and continue to be, to serve the scientific community by acquisition, maintenance, conservation and curation of marine geological samples; to make the scientific community aware of our holdings; to encourage utilization of the collection for scientific study and science educational purposes; to develop consistent policies and procedures through active cooperation with work other marine geological repositories; and to support related activities at SIO and the scientific community at large.

OBJECTIVES

During the tenure of this award our objectives were to:

(1) Develop and maintain adequate space to accommodate materials in the existing collections, and anticipated new acquisitions, under conditions that will properly archive them, minimize their deterioration, and maximize their scientific usability. An immediate need was to expand the refrigerated core-storage facility to accommodate soon-to-arrive core samples and make plans that would ultimately enable us to develop an integrated facility combining collections from other sources (e.g. other UCSD campuses, and institutions in other states, e.g. Oregon and Florida).

(2) Collect, archive and disseminate data in readily accessible formats that would encourage utilization of samples for scientific research and educational purposes. This required digitization (for upload onto the Internet) of all pertinent sample data--a large volume of which required conversion from original hard-copy formats.

(3) Establish and update a comprehensive sample inventory database that is easily searchable on the web for in-office, as well as for use by principal investigators and graduate-student researchers.

(4) Review sample requests, assist researchers in sample selection and distribute sample material to qualified scientists for study in such fields as ocean history, paleo-climatology, deep sea and near-shore geological processes, microfossil evolution, origin of mineral deposits, petrologic and geochemical studies, and tectonic processes.)

(5) Meet with curators of other marine geological collections to promote cooperation, idea and information exchange, reduce redundancy of efforts, and seek means to solve mutual problems.

(6) Conduct out-reach educational activities for the general public to stimulate creative thinking and encourage interest and appreciation of the geological sciences..

(7) Develop a long-range plan for expansion that would include a larger, integrated, full-service laboratory and educational facility.

APPROACH

The Geological Collections has and will continue to provide invaluable material to a wide spectrum of investigators working on all aspects of marine geology. The direction and scope of the purely curatorial tasks has remained much the same as in the past. Each year the SIO Geological Collections has acquired new research and teaching material from recently retired principal investigators at SIO. These are archived along with the broader general collection.

In addition to maintaining present staff positions, the Collections Facility has hired undergraduate students to assist with many curatorial tasks including inventory, bibliography updates, conversion of hard copy to digital format. This provided cost-effective help that also allowed students to gain experience in core and rock handling curatorial techniques, knowledge of geological principles, and hands on experience with material of the earth's crust.

WORK COMPLETED

Sample Acquisition, Distribution and Utilization -We continue to receive additions to the collections in the form of gravity and piston cores, dredge hauls, hand samples, washed residues, prepared slides, and other related samples. During the past year we acquired 176 additional samples from offshore Central California (Eel River) and the Jasper Seamount (Baja California borderlands). A compilation of material acquired and archived during tenure of the award is attached.

We filled requests for 3232 samples for SIO researchers, 3089 samples for non-SIO researchers, and 554 for outreach educational activities. The various research projects were directed to paleoclimate studies, studies on near-shore sedimentation and tectonics, extraterrestrial impacts, studies on radiolaria, and petrology and geochemistry of rocks from ocean trenches, island arcs, seamounts, and mid-ocean ridges. A list of distributed material is attached as an appendix.

In addition, we hosted educational tours and briefings involving a total of 2400 visitors and distributed samples to teachers and students for hands-on classroom work. (*Note* - the samples distributed for outreach teaching purposes are from very large "bulk" materials or material unsuitable for scientific research owing to incomplete data or possible contamination.)

Our geological collections currently comprise more than 7000 cores, rocks from about 4000 dredge hauls, nearly 600 grab samples, and more than 1000 square feet of special collections (in drawers, cabinets and shelves).

Research papers published (60) that made use of samples distributed are on an attached list

NGDC Data -We sent underway and descriptive data to the National Geophysical Data Center (NGDC) in Boulder, Colorado for inclusion in the Curators' Database for 27 samples from four expeditions.

Special -Collection Inventories – Our Special Collections represent material acquired by individual researchers and donated to the SIO Geological Collections. Many samples (such as the samples used for pioneer research on Helium isotope systematics by the late Dr. Harmon Craig) contain irreplaceable scientifically significant materials including type specimens, samples from type localities or samples for which study led to development of key geological concepts and theories. We are continuing to make an inventory of these collections, digitize information about the collections, and the samples and otherwise ensure their preservation, conservation and future utilization. When archiving is completed, the material in these collections will be made available to qualified users for further research

WEB-SITE DEVELOPMENT

Public outreach has been an increasingly important priority for the Geological Collections. Our staff, in conjunction with other SIO groups, put a public web site on line in April 2003. Geological Collections further upgraded its site with a searchable bibliography containing more than 1800 citations for publications based entirely, or in part, on study of materials from the SIO Geological Collections. Data for the recently acquired Riedel/Sanfilippo Radiolarian Collection (comprising more than 23,000 sample records) has been converted to a searchable on-line file and will be linked to the collections sites soon. An on-line sample request form is also available to researchers who wish to request samples for research or teaching.

The Geological Collections Staff has also upgraded "flat" (non-searchable) files to aid scientists and the general public in gaining information about holdings and operations of the SIO Geological Collections. This includes data related to expeditions on which samples were collected, core and dredge sample data, inventories of "Special Collections", procedures for describing cores, and illustrated guides to recognizing fossil and mineral components in smear slides.

To view SIO Collections sites go to <http://collections.ucsd.edu/cs/>

RESULTS

The SIO Geological Collections is a service organization dedicated primarily to assisting other marine geologists in the pursuit of their research objectives. There is no plan at this time to engage in first-hand technical studies.

IMPACT/APPLICATIONS

Our impact on science has been in supporting studies in a broad range of disciplines with the ultimate goal of understanding the geologic history of the earth. Our samples include rocks of the ocean crust that indirectly give insight to the earth's upper mantle. The oceanic sediments record information about evolution of marine organisms, paleo-climate and paleo-oceanography as well as to give insight to the nature of continental crust and the mutual interactions of hydrosphere, atmosphere, and lithosphere. Historically, the study of materials in the SIO Collections have produced innovative concepts and opened whole new fields of scientific endeavor. Some examples are William R. Riedel's work that established the field of radiolarian biostratigraphy, Wolfgang Berger's work in reconstructing Pleistocene temperatures on the basis of oxygen isotopes in foraminifer tests, and calcite compensation depths on the basis of foraminifer-test dissolution, Francis Shepard's pioneering work on near-shore geological processes, Robert L. Fisher's pioneer explorations of the geology of ocean trenches, Al and Celeste Engel's fundamental contributions on the petrology of crust formed at ocean ridges, and Harmon Craig's studies on Helium isotopes and their significance to oceanic magma sources.

Other recent studies are noted in PUBLICATIONS below.

TRANSITIONS

Others utilize our samples, collective knowledge, facilities, equipment, and data archives (both hard copy, digitized and Internet accessible) to further educational goals or research goals. Archived scientific collections are used and needed to test reproducibility of previous studies and to conduct original studies testing new hypotheses. An important aspect of this effort is to save "type" material for future study utilizing new ideas, tools, and technology.

Our collections also provides a managed repository in which retiring scientists can place their research collections with the knowledge that they will be accessible to others for research in the future.

Although most of our collections were derived from SIO expeditions, and/or from SIO researchers, we have curated certain related collections from other sources, for example those from the Navo9802 (CRNR02) expedition that collected samples for the Navy's Shallow Water Training Range Technology Development program.

Some specific services include core splitting, core photography, preparation of sediment descriptions in support of specific projects.

RELATED PROJECTS

We maintain a close link with NOAA's **National Geophysical Data Center (NGDC)** in Boulder, providing core and dredge sample data for the Curators' Data Base, a searchable, comprehensive database incorporating data for marine and lake environments from twenty major U. S. institutions and government agencies. The database, comprising data for over 100,000 samples, may be accessed at

<http://www.ngdc.noaa.gov/mgg/curator/curator.html>

We actively participate in **The Curators Of Geological Samples Group**, an informal body created to provide scientific advice to NGDC as regards development and maintenance of the Curators' Database, to exchange ideas about collections management and provide a coactive environment in which to advance curatorial activities. See <http://www.ngdc.noaa.gov/mgg/curator/oct98minutes.html> .

The **SIO Geological Data Center** and the Geological Collections are engaged in discussions to utilize underway and digitized Collections data in conjunction with the National Science, Technology Engineering and Educational Digital Library (NSDL), an effort to create a national on-line network of "learning environments and resources.

The SIO Geological Collections contributes to the efforts of the **SIO Stephen Birch Aquarium** in providing specimens, offering ideas, and teachers visited the facility.

We also work closely with the **SIO Directors Office** and other SIO/UCSD groups in promoting awareness and appreciation of the geosciences and contributing to educational outreach programs.

The following pages summarize Geological Collections staff activities and contributions to the research community and to community outreach education.

Appendix 1 – New Acquisitions

Appendix 2 – Samples Distributed to SIO Researchers

Appendix 3 - Samples Distributed to Non-SIO Researchers

Appendix 4 – SIO Geological Collections Outreach Educational Programs

Appendix 5 – Publications Based on SIO Geological Collections Material, 1995 – 2003

Appendix 1 – New Acquisitions

<u>Date</u>	<u>Sample Quantity</u>	<u>Sample Type</u>	<u>Investigator</u>	<u>Expedition(s)</u>	<u>Purpose of activity</u>
1995 Dec 19	1	ACQ, DR	Mogk, S., Christie, D. OSU	WEST10	Acquisition of 1 part of 1 dredge haul via Mogk of SIO
1996 Jan 22	37	DR, ACQ	Phinney, A. Capt. SIO	1/75	ACQUISITION of 37 Mn nodules via D. Day (SIO LIBR)
1996 Jul 01	2	ACQ, DR	Lonsdale, P. SIO	Boomerang leg 9	Acquire 2 dredge hauls
1996 Jul 29	78	ACQ, DR	Michael, P. & Hanan, B. Univ Tulsa & SDSU	SMRT	Dredge haul acquisition ; 78 hauls from So. Atlantic, R/V Knorr (WHOI)
1996 Sep 10	43	ACQ, CO	Burke, S. SIO	ERDC	Returned samples
1996 Oct 10	6	ACQ, CO	Herguera, J.C. SIO/CICESE	BAP96	Core acquisition
1997 Jul 01	5000	ACQ, DR, LS	Engel, A.E.J. (deceased) SIO	Land samples, NOVA, CIRC, PIDR	Large global terrestrial igneous rock collection with selected oceanic igneous rock
1997 Jul 31	3	ACQ, CO	Herguera, J.C. SIO/CICESE	ET97	Core acquisition
1998 Feb 24	2	ACQ, CO	Bernhard, J.M. U So Carolina	SBB298	Acquire 2 box cores, Santa Barbara Basin
1998 Jun 22	73	ACQ, GB, DR	Zaiger, K. USN	CRNR02NH	Acquire core, grab & dredge material, Cortes Bank
1998 Jul 02	53	ACQ, DR	Langmuir, C. & Bender, J. LDEO & UNCC	PANR01	Acquire 93 dredge hauls; return 40
1998 Jul 02	92	ACQ, DR	Karsten, J. & Klein U Hawaii	PANR04	Acquire 92 dredge hauls
1998 Jul 02	6	ACQ, DR	Gee, J. SIO	PANR06	Acquire 6 dredge hauls
1998 Nov 04	10	ACQ, DR	Hawkins, J. SIO	ALAR02	Acquire dredge hauls from Alarcon Expedition
1999 Apr 16	105	ACQ, CO, GB	Zaiger, K. & Conner, C. NOO	OAOA03	Acquire core/grab rx and sed
1999 May 11	102	ACQ, DR	Koppers, A., Lonsdale, P., Castillo, P. SIO	AVON02, AVON03, AVON04	Acquire & box AVON02,03,04
1999 Jun 14	7	ACQ, CO	Ransom, B. SIO	ALAR	Acquire 13 multi-cores & gravity core, Alarcon Expedition
1999 Jun 20	5	ACQ, CO	Lange, C. SIO	SS061799	Acquire Salton Sea cores
1999 Oct 14	5	ACQ, CO	Gieskes, J & C. Mahn	RGS99-13	Acquire, split, photograph, sample
1999 Dec 02	339	ACQ, LS	Meurer, B. Duke	Stillwater CPLX	Acquire Stillwater Complex rocks
2000 Jan 27	125	ACQ, CO	Hildebrand, J. SIO	COASTAL (SDAG)	Acquire coastal cores for near shore archaeology/environmental study
2000 Feb 03	1	ACQ, CO	Herguera, J.C. SIO/CICESE	ALAR	Acquire, split, photograph piston core
2000 Jul 17	29	DR, ACQ	Fornari, D. via R. Comer SIO	NEMO	Acquisition of dredge rocks
2000 Jul 19	15	ACQ, DR	Craig, H. SIO	HYPO, CYP78, SAL GOM, CERE, AMPH , PLDS, TR, INMD, C L, MAGM	Acquisition
2000 Dec 06	4	ACQ, CO	Herguera, J.C. CICESE, Baja CA.	PCM00	Acquire cores from Pacific coast of Mexico
2001 Jan 05	55	ACQ, DR, ALV	Blackman, D. SIO	AT3-60, ALV	Acquire dredge & dive samples
2001 Jan 31	4	ACQ, CO	Herguera, J.C. CICESE	PCM00	Acquire Cores
2001 Feb 22	6	ACQ, CO	Mahn, C., Gieskes, J.	NH0102	Core Acquisition
2001 May 04	7	ACQ, CO	Gieskes, J., Rathburn, T. SIO	EELR	Acquire 7 gravity cores
2001 Jul 30	78	ACQ, DV	Bernhard, J.M. U So Carolina	JMB	Dive sample sediment from Antarctica, Explorers Cove

2001 Oct 17	69 ACQ,DR	Bloomer, S. OSU	COOK07MV	Acquire 69 dredge hauls (in 52 wooden boxes)
2001 Nov 10	40 CO,ACQ	Schwehr, K. SIO	TTN136B	Acquire and sample cores
2002 Apr 19	57 ACQ,DR	Naar, D., USF	DRFT06RR	Acquire 48 buckets from 57 dredge hauls
2002 May 08	6 ACQ,DR	Konter, J. SIO	JSPR01NH	Thesis research, petrology
2003 Feb 25	35 ACQ,LS	Andersen, P. Palomar College	Island Sediments	Education material for Ed Sed Sets with Wolf Berger
2003 Jul 03	6 ACQ, CO	Schwehr, K. SIO	VI-81-SC	Acquire cores from Gaviota slide in Santa Barbara Basin for anisotropy of magnetic susceptibility of slide.
2003 Jul 30	38 ACQ,PH O	Stewart, J. SIO	Several	Archive bottom photo film from 1950-60's
2003 Aug 10	3000 ACQ,DR, LS	Craig, H. SIO (deceased)	SIQR,BNTH,HYDR ,PPTU,PASC,STO M,CCTW,ALCY,H ELI,MRTN,RNDB, ERDC,DODO,MAR A,MAGMA,SOB,S OTW,DPSN,VLCN, PLDS,HYP0,CERE ,AMPH,GEOSECS, ALVIN & A2 trips	Geochemistry, earth, ocean and atmospheric gasses. Very large collection of researched material estimated at over 3000 samples (>1863 containers of rock fragments and powders).
2004 Feb 04	16 ACQ,DIV E	Natland, J. U. Miami, Rosenthal SMAS	Jason Dive	Igneous rock acquisition about 1000 lbs in 16 boxes.

Appendix 2 – Samples Distributed to SIO Researchers

Samples to SIO Researchers

Geological Collections

Scripps Institution of Oceanography

Page: 1

Date	No. of Samples	Sample Type	Investigator	Expeditions	Purpose of Sampling
1995 Oct 13	4	DR	Gee, J. SIO	CHEP	EPR Geochemistry
1995 Oct 17	6	CO	Wainwright, S. SIO	CLMR02	Organic Carbon, XRD
1995 Oct 23	123	DR	Gee, J. SIO	PHNX02	Basalt petrology
1995 Dec 07	4	CO	Herguera, J.C. SIO	CICESE 95nov	Acquisition 4 Kasten cores
1995 Dec 22	13	CO	Kim, DongSeon SIO	CLMR01,CLMR02	C14 & C13 Dating
1996 Jan 05	8	CO	Yasuda, M. SIO	ERDC	Forams
1996 Jan 09	8	CO	Kauffman, C. SIO	CLMR02,A2-131-10	Marine Fungi
1996 Jan 18	9	CO	Kim, D.S. SIO	CLMR02	C14 Dating
1996 Feb 06	77	CO	Herguera, J.C., Perez, E. SIO	PLDS	Biogenic opal & % Carbonate
1996 Feb 14	12	CO	Kok, Y. SIO	ERDC	Paleomag
1996 Mar 08	10	CO	Kim, D.S. SIO	CLMR02	C14 Dating
1996 Apr 17	18	CO	Perez, E. SIO	INMD	Benthic forams
1996 May 24	150	DR	Hawkins, J. SIO	PPTU04,RNDB15	Petrology
1996 Jun 05	42	CO	Herbert, T. SIO	RGS0487	Alkenone paleo-temp reconstruction
1996 Jul 22	27	CO	Ransom, B. SIO	CLMR01,CLMR02	Matter-clay mineral associations
1996 Oct 04	71	CO	Herguera, J.C. SIO	BAP94	Paleoclimate, isotope
1996 Oct 30	1	CO	Yasuda, M. SIO	PLDS	Isotopes from Sacculifer
1996 Nov 25	141	CO	Herguera, J.C. SIO	LAPAZ, RGS0487	Stable isotope, paleoclimate
1997 Jan 22	14	DR	Lonsdale, P. SIO	WELOC77, 7TOW	Dating Galapagos and Tonga Trench basalts
1997 Mar 10	1	CO	Riedel, W.R. SIO	CRGN	Ichthyolith study
1997 Mar 11	3	ALV	Cobb, Kim SIO	ALV1100	Barite study
1997 Mar 19	14	CO	Lai, D. SIO	ERDC	Be isotope glacial calibration
1997 Apr 12	3	DR	Hawkins, J. SIO	INDP	Petrology
1997 Apr 16	8	CO, DR	Peng, Zhu SIO	INMD,BAJA69	Ca isotope research
1997 May 15	24	CO	Herguera, J.C. SIO	RGS0487,CA94,PLDS	Forams and C14 dating
1997 May 28	27	CO	Kauffman, C. SIO	ANTP,CLMX01	Microbial growth in sed.
1997 Jul 21	6	DR	Lonsdale, P. SIO	WELOC77	Mineralogy
1997 Jul 31	80	CO	Herguera, J.C. SIO/CICESE	ET97	Paleoenvironment, foraminifera
1997 Sep 02	1	CO	Paytan, A. SIO	INMD	Education
1997 Sep 17	114	CO	Perks, H. SIO	RNDB, ERDC	Oxygen in sediment, paleoclimate
1997 Dec 02	146	CO	Perks, H. SIO	RNDB	Paleoenvironment study using Chlorin

Date Samples Type Investigator Expeditions Purpose

1998 Jan 15	13	CO	Perks, H. SIO	ERDC, PLDS	O2 Combustion demand
1998 Jan 23	8	CO	Paytan, A. SIO	INMD	Barite/paleoenvironment
1998 Feb 09	26	CO	Perks, H. SIO	ERDC, PLDS	O2 Combustion demand
1998 May 07	258	CO	Herguera, J.C. SIO/CICESE	PLDS, LPAZ	Paleoproductivity & forams
1998 May 22	2	CO	Ransom, B. SIO	CRGN	Foram study
1998 Jun 09	4	CO	Lal, D. SIO	PLDS, INMD	Geo & Cosmo Chemistry
1998 Jun 10	61	CO	Perks, H. & Giordano, J. SIO	PLDS	Combustion O2 Demand
1998 Jul 06	28	CO	Herguera, J.C. SIO/CICESE	ET97	No. Pac. Thermocline & Paleo-productivity
1998 Jul 17	57	CO	Herguera, J.C. SIO/CICESE	ET97	No. Pac. Thermocline & Paleo-productivity
1998 Jul 29	8	CO	Perks, H. & Giordano, J. SIO	PLDS	Combustion O2 demand
1998 Aug 05	13	CO	Perks, H. & Giordano, J. SIO	PLDS	Combustion O2 demand
1998 Sep 08	6	CO	Lal, D. SIO	AMPH, CRGN, WAH	Geochemistry, mineralogy
1998 Sep 29	6	DR, LS	Fisher, R.L. SIO	CHEP, CIRC	Education
1998 Dec 03	1	CO	Lal, D. SIO	CRGN	Mineralogy
1999 Feb 24	39	CO	Lange, C. SIO	SABA79	Forams & sedimentation
1999 Sep 14	11	CO	Kauffman, C. SIO	MSN, PROA	Bacterial study
1999 Oct 15	2	DR	Munk, W. SIO	CHEP 55D	Gift for Emperor of Japan and Dr. Inamori
1999 Dec 22	5	CO, DR	Lal, D. SIO	ZTES3, MERO, DODO, C RGN	Mn accumulation rates
2000 Feb 03	20	CO	Herguera, J.C. SIO/CICESE	ALAR	Paleoceanography
2000 Mar 02	6	CO	Lal, D. SIO	INMD	Be10, Be13 isotope study
2000 May 01	26	CO	Herguera, J.C. CICESE/SIO	ET97	Stable isotopes, Glacial studies, change in No. Pacific ventilation
2000 May 18	94	CO	Cragan, J. & Blaine, T. SIO	AMPH, PLDS	18 O Isotope, paleoclimate
2000 Jun 09	63	CO	Lange, C. SIO	SS061799	Salton Sea restoration
2000 Jun 30	42	CO	Blaine, T. SIO	AMPH	Paleoclimate study
2000 Jul 13	25	LS	Winterer, E.L. Severinghaus, J. SIO	Winterer Collection	Fossil sedimentation
2000 Jul 20	9	DR	Lonsdale, P. SIO	SOB, PV	Tectonic evolution, Baja Calif coast
2000 Sep 23	264	CO	Herguera, J.C. CICESE/SIO	LPAZ, ALAR	Paleoclimate, glacial stratigraphy
2001 Jan 16	2	DR	Hawkins, J. SIO	HYPO	Basalt petrology
2001 Jan 23	4	CO	Schwehr, K. SIO	CRGN	Sedimentation and magnetic fabric
2001 Feb 22	3	CO	Mahn, C. SIO	NH0102	Pore water, geochem
2001 May 10	3	CO	Ransom, B. SIO	CLMR02	Quartz sand/DNA study
2001 Jun 06	26	GB	DeMoustier, C. SIO	OAOA03	USN sed types; acoustic reflective properties
2001 Jul 31	6	CO	Wei, W. SIO	AMPH	Nanno-fossil dating

Date Samples Type Investigator Expeditions Purpose

2001 Oct 26	1	DR,PH	Fenical, B. SIO	NOVA	Bottom photo for talk/pub.
2001 Nov 30	21	CO	Hildebrand, J. SIO	SANDAG	Age dating and Curation
2002 Jan 07	232	CO	Schwehr, K. SIO	TN136B	Thesis research, Geology - tectonics
2002 May 16	158	CO	Herguera, J.C. CICESE/SIO	LPAZ 21P	Paleoclimate
2002 Jun 24	7	CO	Rathburn, T., Mahn, C. Ind St & SIO	SABA79,ERDC,DODO, CRGN	Geochem benthic forams
2002 Aug 15	15	DR,ALV	Gee, J. SIO	AT3-60	Petrology
2002 Aug 21	4	CO	Driscoll, N. SIO	TAHO02	Acquire 4 cores age dating & geophysical study
2002 Aug 28	3	CO	Wei, Wei SIO	CLMR02	Clay separation study
2002 Sep 06	140	DR	Konter, J. SIO	JSPR01NH	Sample Jasper Smt rocks for mantle lithic fragments
2002 Nov 26	6	CO,DR	Lal, D. SIO	TN037,CRGN	Mn nodules, calc & red clay sediment
2002 Dec 09	13	DR	Perez, J. SIO	AVON02	Petrology, mineralogy and chemistry
2002 Dec 13	160	CO	Herguera, J.C. SIO/CICESE	PCM00	Paleo environment/climate study
2002 Dec 16	25	CO	Driscoll, N., Kent, G., Babcock, J. SIO	TAHO02	Split and describe vibracores from Lake Tahoe for C14 dating & paleoenvironment study.
2002 Dec 30	1	CO	Norris, R. SIO	CRGN	Education
2002 Dec 30	18	DR,ALV	Blackman, D. SIO	AT03-60	Geochemistry
2003 Jan 16	34	CO	Herguera, J.C. SIO/CICESE	PCM00	Paleoproductivity, paleoclimate
2003 Jan 17	4	CO	Munson, J. SIO	LSDA, CIRC	Pleistocene ocean circulation & climate
2003 Feb 04	3	CO	Hildebrand, J. SIO	SANDAG	Paleo environment/climate, C14 dating & mollusca fossil studies.
2003 Mar 04	4	ALV	Blackman, D. SIO	AT03-60	Petrology analysis
2003 Mar 18	34	CO	Schwehr, K. SIO	TTN136B	Geochem Core study for PhD thesis
2003 Apr 22	20	CO	Schwehr, K. & Lindemann, C. SIO	TTN136B	Pb and Cs dating
2003 May 05	4	CO	Schwehr, K. SIO	TTN136B	C14 AMS anaysis
2003 Jul 16	1	CO	Harris, A. SIO	TTN136B	Flocculation and magnetism
2003 Jul 29	18	DR,ALV	Blackman, D. & Kelley, D. SIO & U.	AT03-60	Carbonate rock genesis
Sum:	3232				

Date Samples Type Investigator Expeditions Purpose

Appendix 3 - Samples Distributed to Non-SIO Researchers

Samples to Reseachers not at SIO

Geological Collections

Scripps Institution of Oceanography

Page: 1

Date	No. of Samples	Sample Type	Investigator	Expeditions	Purpose of Sampling
1996 Feb 12	46	CO	Kelts, K. Univ Minn	TITI	Calcite mineralogy, paleoclimate
1996 Feb 16	281	CO	Schuffert, J. Brown Univ	RGS0487	Phosphorite, biogeochemistry
1996 Mar 01	8	DR	Anderson, I. Smithsonian Inst.	CHEP, WEST03, ANTP, AR ES	Ocean Planet Exhibition
1996 Aug 19	9	CO	Field, J. U Washington	HB	X-ray for interdecadal population dynamics, Herendeen Bay, Alaska
1996 Sep 19	7	DR	Hanan, B., Willis J. SDSU	SMRT	7 bags of SMRT to SDSU for B. Hanan
1996 Nov 25	42	DR	Trego, K. Nautilus Malacology Inst	DWH	Shell taxonomy
1996 Dec 19	21	CO	Mangini, A. Heidelberg Acad	RNDB	Th 230 dating sediments, stratig
1997 Feb 05	2	CO	Ziveri, P. Vrije Univ Amsterdam	STYX, AMPH	Paleoceanography education, 2 students
1997 Feb 11	11	CO	Martin, Ellen Univ. Fla	CRGN	Nd & Sr in Fishteeth
1997 Dec 17	74	DR	Galer, S. Max Planck Inst. Germany	38 Expeditions	Mn growth study
1998 Feb 20	270	DR	Niu, Y. U Queensland	ALL	Peridotite study
1998 Feb 20	54	DR	Adkins, J. MIT	BNTH, WEST03, 7TOW	Coral study/paleoenvironment
1998 Feb 26	2	DR	Sloan, H. AMNH, NY	GLOR04, unknown	Educational display
1998 Mar 27	5	CO	Higginson, M. U Bristol	RNDB	Chlorin/chlorophyll studies
1998 Apr 29	1	CO	Deen, P. Palomar Coll	CRGN	Education sample of foram ooze
1998 Jun 03	3	DR	Whiteley, N. U Oxford	DODO, ERDC	Paleoceanography & Mn
1998 Jun 18	79	DR	Hein, J. USGS, Menlo Park	TN037, ANTP, NOVA, ZTE S, GMAT, INMD	Mn crust paleoenvironment study
1998 Jun 30	6	CO	Dowsett, H. USGS, Reston	GUAY, LPAZ, CLMR02	Paleo-climate
1998 Jul 20	26	DR	Boss, S. U Arkansas	CRNR02	Petrology & dating
1998 Aug 24	9	DR	Clift, P. WHOI	PPTU05	Geochemistry
1998 Oct 22	11	CO	Loubere, P. No. Illinois Univ.	CARR2, SCAN, AMPH, ER DC, PROA	Foram paleoproductivity
1998 Nov 02	7	CO	Specht, J. Univ. Heidelberg, De	ERDC	U/Th isotope study
1998 Nov 04	11	CO	Stoll, H. Univ. Oviedo, Espana	INMD, LSDA	Ca/Sr paleoceanography
1999 Jan 07	45	LS	Fourtanier, E. Cal Acad Science	SPEED-81BC	Diatoms
1999 Jan 29	15	CO	Mudie, P. Geol Surv Canada	RGS0487, CLMR	Dinoflagellate paleoproductivity
1999 Feb 11	20	CO	Loubere, P. Northern Illinois Univ	ERDC, LSDH, DODO	Forams & calcite dissolution
1999 Mar 03	55	DR	Regelous, M. Max-Plank, De	STYX, TSDY, ARES	Sr, Nd, Pb, Hf isotopes study
1999 Jul 22	82	DR	Hart, S. WHOI	AVON03	Dredge shipment to WHOI
1999 Aug 30	48	CO	Higgins, S. LDEO	RNDB	230Th isotope study

Date Samples Type Investigator Expeditions Purpose

1999 Sep 28	31	DR	Zhou, W. U. Mich	CHEP,PHNX02,RAIT02	Basalt alteration
1999 Nov 02	78	CO	Paytan, A. Stanford	INMD,DODO,LSDA	Barite study
1999 Dec 16	34	CO	Palmer, M. Univ Bristol	ERDC	Boron isotope/forams
1999 Dec 17	27	CO	Van Beek, P. LSCE Inst, Fr	PLDS,ERDC	CO3 cycle
1999 Dec 31	1	DR	Plank, T. Boston Univ	MARA	Mafic petrology
2000 Feb 18	4	DR	Piontkowski, D. USNA	CHEP,TUNE04,STOM	Basalt alteration
2000 Mar 23	11	DR	Janney, P. Carnegie Inst.	PROT,GLOR	Petrology
2000 May 09	35	DR	Wang, D. Univ. Michigan	PHNX02,CHEP	Chemistry, magnetic studies
2000 May 11	2	CO	Paytan, A. Stanford	SBB bulk	Organics, O isotopes
2000 Jun 13	9	CO	Urquhart, E. Univ. College London	CHUB, AMPH, LSDH, JYN5, CAPB,	Radiolarian Stratigraphy
2000 Jun 20	104	DR	Sager, W. TAMU	AVON02	Magnetic study
2000 Jun 22	6	CO	Loubere, Paul No. Illinois University	AMPH,BNFC,PLDS	Paleoflux of CaCO3 to seafloor
2000 Aug 11	6	CO,Bulk	Paytan, A. Stanford	SBB96	Organic phosphorus studies
2000 Sep 21	8	CO,Bulk	Paytan, A. Stanford	PLDS	Barite studies
2000 Oct 20	32	CO	Van Beek, P. LSCE/CNRS-Gif, Fr.	PLDS, ERDC	CO3 cycle & sed rates
2000 Dec 18	76	CO	Davis, O. U.Ariz; Pope, K. Washington DC	SDAG	Near shore archaeology/environmental study
2001 Feb 21	9	CO	Paytan, A. Stanford	PLDS, INMD, DODO, LSDA	Barite Studies
2001 Mar 01	32	CO	Paul, M. Weitzmann Inst. of Sci.	TRIP 7P, CRGN 128BX	Interstellar Dust/rare actinides
2001 Mar 23	11	LS	Zhong, S. Nanjing Inst. Paleo, Geol., China	Bramlette Collection	Nanno fossil study
2001 Apr 04	4	CO	Martin, E. University Florida	CRGN, SOTW	Nd isotopes in fossil fish teeth
2001 Jul 20	1	CO	Streng, M. Univ Bremen	AMPH	Nanno-fossil research
2001 Jul 26	18	CO	Watkins, S. Lancaster Univ	INMD	Sediment magnetics
2001 Dec 14	8	CO	Gupta, S.M. Nat Inst Ocean, India	TSDY	Radiolarian study
2002 Mar 01	3	CO	Averyt, K. Stanford Univ.	PLDS	Barite, weathering, & paleoclimate
2002 May 02	64	CO	Abbott, D. & Hagstrum, J. LDEO & USGS	AMPH,PLDS,JYN5,DOD O,SCAN,MSN,ANTP,LSD A,SOTW	Impact debris in sediment
2002 May 31	36	DR	Layne, G. WHOI	CERE, RSTH	Isotope study, Cocos plate
2002 Jul 08	6	DR	Brunelli, D. Inst Mar Geol, CNR, Italia	PROT	Petrology, chemistry
Sample Sum:	3089				

Date Samples Type Investigator Expeditions Purpose

Appendix 4 – SIO Geological Collections Outreach Educational Programs

Page: 1

Scripps Institution of Oceanography

Geological Collections

Education Programs

Date	No. of Samples	Sample Type	Investigator	Expeditions	Purpose of Sampling	Visitors
1996 Jan 10	0	ED	Chaffe, Matt UCSD	ALL	Education tour/discussion, 6 students	6
1996 Mar 11	77	ED,DR	Deen, P. Palomar Coll.	CHEPR	Education tour/discussion 125 students	125
1996 Apr 25	0	ED	Hahn, H. SIO Aquarium	ALL	Education tour/discussion 40 visitors McKinsey & Co.	40
1996 May 01	0	ED	Garrison, T. Orange Coast Coll.	ALL	Education tour/discussion 30 honors students	30
1996 Jun 03	1	ED,DR	Trujillo, A. Palomar Coll.	ALL, STYX	Education tour/discussion 15 students, 1 chert sample	15
1996 Aug 02	0	ED	Brady, L. Caltech	ALL	Educational tour/discussion 47 students	47
1996 Sep 03	0	ED	Turjillo, A. Palomar College	ALL	Education tour/discussion 125 students	125
1996 Sep 16	0	ED	Gray, S. USD	ALL	Education tour/discussion 20 students	20
1996 Nov 20	0	ED	Garrison, T. Orange Coast Coll	ALL	Education tour/discussion 23 honors ocean. students	23
1997 Jan 23	0	ED	Munasinghe, T. USD	ALL	Education tour/discussion 19 students	20
1997 Feb 10	0	ED	Kitazawa Japan	ALL	Facility tour & Geology discussion	0
1997 Feb 10	35	ED	Comer, Ron SIO	DPSN	Mn nodule discussion	0
1997 Feb 13	0	ED	Munasinghe, T. USD	ALL	Educational tour and ocean discussion, 20 students	20
1997 Mar 03	0	ED	Trujillo, A. Palomar College	ALL	Education tour/discussion 105 students	105
1997 Mar 12	0	ED	Munasinghe, T. USD	ALL	Educational tour and discussion, 5 students	6
1997 Mar 21	0	ED	Alexander, J. Carlsbad HS	ALL	Educational tour and discussion, 6 students	6
1997 Apr 09	17	ED,DR	Yasuda, M. SIO	SIQR,CHEP,RAIT,ANTP	Marine Igneous rocks for class	1
1997 Apr 30	0	ED	Garrison, T. Orange Coast Coll.	ALL	Educational tour and discussion, 25 students	27
1997 May 29	10	ED	Sheldon, S. & Collins, C. SD Nat Hist Museum	ALL	San Diego Nat Hist Museum seminar tour & discussion	10
1997 Jun 04	76	ED,CO	Charles, C. SIO	ERDC,VLCN,AMP H,PLDS, INMD	Foram Isotope, Glacial stratigraphy	11
1997 Aug 30	0	ED	Franks, S. Birch Aquarium	ALL	Educational tour and ocean discussion, 30 teacher visitors	30
1997 Sep 09	0	ED	Poag, W. WHOI	ALL	Information on sample forms	0
1997 Sep 09	0	ED	Zampol, J. SIO	ALL	Education, reference	1
1997 Sep 24	0	ED	Trujillo, A. Palomar College	ALL	Educational images for text	1
1997 Sep 30	1	ED	Deen, P. Palomar College	ALL	Educational tour and ocean discussion, 150 students; sample loan	150
1997 Oct 10	32	ED,CO,DR	Szulgit, G. SIO	CHEP,AG69,PLD S,RNDB,STYX,S BB	Loan education samples for teachers with Jason Project in Ontario and Texas	1

Date

Samples Type

Investigator

Expeditions

Purpose

Visitors

Scripps Institution of Oceanography

Geological Collections

Education Programs

1997 Oct 28	6	ED, PH	Trujillo, A. Palomar Coll	ALL	Loan microfossil images for new text	1
1998 Mar 06	0	ED	Trujillo, A. Palomar Coll.	ALL	Educational tour and ocean discussion, 120 students	120
1998 Mar 13	30	ED	Slowiczek, F. SDSEA	ALL	Educational marine geology discussion, 100 teachers; sample loans	0
1998 Apr 21	0	ED	Tupper, D. Southwestern College	ALL	Education and class discussion	13
1998 May 28	1	ED,CO	Hahn, H. SIO	CRGN	Loan sample Birch Aquarium Education	1
1998 May 29	2	ED,DR	Cassano, Kim Serra Mesa Elem	CHEP	Education and class discussion; sample loan	0
1998 Aug 21	0	ED	Deen, P. Palomar College	ALL	Education and class discussion	125
1998 Sep 10	0	ED	Sturz, A. USD	ALL	Education and class discussion	6
1998 Nov 05	0	ED	Tupper, D. Southwestern College	ALL	Education and class discussion	21
1999 May 10	1	ED,CO	Ransom, B. SIO	CRGN03	Bulk sediment for education; sample loan	1
1999 May 11	2	ED,CO	Bertine, K. SDSU	CRGN03	Bulk foram/rad/red clay sediment for education; sample loan	0
1999 Sep 25	0	ED	Deen, P. Palomar College	ALL	Education and tour/discussion	100
1999 Sep 30	0	ED	Liles, T. Southwestern College	ALL	Education and tour/discussion	25
1999 Oct 05	0	ED	Rathburn, T. USD	ALL	Education and tour/discussion	10
1999 Oct 27	0	ED	Gray, S. USD	ALL	Education and tour/discussion	15
1999 Oct 27	0	ED	Brice, D. San Marcos Middle Sch	ALL	Education and tour/discussion	13
1999 Oct 27	0	ED	Garrison, T. Orange Coast College	ALL	Education and tour/discussion	25
1999 Nov 18	0	ED	Glasgow, M. SIO Aquarium	ALL	Education and tour/discussion	40
2000 Feb 24	0	ED	Liles, T. Southwestern College	ALL	Education and tour/discussion	14
2000 Feb 25	0	ED	DuBois, L. Palomar College	ALL	Education and tour/discussion	60
2000 Feb 28	12	ED,CO	Chamberlain, T. Colo St Univ	CRGN	Educational sediment samples	0
2000 Feb 29	0	ED	Lange, C. SIO	ALL	Education and tour/discussion	8
2000 Mar 09	2	ED,DR	Gardner, K. SIO	CHEP	Internet Gala samples	2
2000 May 03	0	ED	Garrison, T. Orange Coast College	ALL	Education and tour/discussion	20
2000 May 03	100	ED,CO	Lange, C. & Schimmelmman,A. SIO/U Indiana	SABA79	Xray, paleoenvironment; plus lecture/demo presentation for OCC	4
2000 Sep 15	0	ED	Rathburn, T. USD/SIO	ALL	Tour and discussion	20

Date

Samples Type

Investigator

Expeditions

Purpose

Visitors

Scripps Institution of Oceanography

Geological Collections

Education Programs

2000 Oct 06	60	ED,DR	Helling, H. Ocean Institute, Dana Point, CA	VLCN,CIRC,PRO T,RNDB	Education display at O.I., Dana Point, CA	4
2000 Nov 06	0	ED	Orlins, M. Birch Aquarium at SIO	ALL	Tour and discussion	25
2000 Nov 29	0	ED	Garrison, T. Orange Coast College	ALL	Education and tour/discussion	23
2001 Jan 10	0	ED	Baker, R. Ocean Institute, Dana Point, CA	ALL	Education tour and discussion	4
2001 Feb 14	2	ED,CO	Bertine, K. SDSU	MSN, PLDS	Class-room reference sediment	1
2001 Feb 21	0	ED	Paytan, A. Stanford	ALL	Tour and discussion	10
2001 Feb 26	3	ED,CO	Baker, E. SDSU	CRGN, INMD	Education Reference samples.	1
2001 Feb 26	0	ED	Deen, P. Palomar College	ALL	Tour and education discussion	85
2001 Mar 04	7	ED	Chamberlain, T. Colo. St. U.	ERUPT V,EC,SABA93,IN MD,PLDS	Education samples	0
2001 Mar 06	0	ED	Bochicchio, G. Mira Costa College	None - Cancelled	Tour and Education Discussion	0
2001 May 02	0	ED	Garrison, T. Orange Coast College	ALL	Facility tour and geology lecture	25
2001 Sep 28	0	ED	Bochicchio, G. Mesa, Mira Costa, Miramar College	ALL	Collections tour and marine geology discussion.	25
2001 Oct 01	0	ED	Dubois, L. Palomar College	ALL	Collections tour and marine geology discussion.	135
2001 Oct 22	6	ED	Alcorn, A. Carlsbad High School	ALL, CHEP special	Video tape S&T plus site visit.	1
2001 Nov 28	0	ED	Garrison, T. OCC	ALL	Student facility tour/discussion	30
2001 Dec 28	0	ED	Paytan, A. Stanford	ALL	Facility tour/discussion	12
2002 Feb 26	4	ED,CO	Perez, E. Indiana State Univ.	PLDS, ANTP, INMD, BNFC	Education use of bulk sed. + slide	0
2002 Mar 25	4	ED,CO,DR	Bohrer, D. Western Washington Univ	CRGN, STOM, CHEP	Education samples	3
2002 Apr 05	0	ED	Bochicchio, R. Mira Costa College	ALL	Facility tour/discussion	10
2002 Apr 09	2	ED,CO,DR	Andersen, P. Palomar College	ERDC, PHIN	Education samples	2
2002 May 08	0	ED	Garrison, T. OCC	ALL	Facility tour/discussion	30
2002 May 22	0	ED	DuBois, L. Palomar College	ALL	Education tour and discussion	21
2002 Jun 05	0	ED	Kammen, G. & Smith, J.B. Intelcom	ALL	Video interview for classroom	5
2002 Aug 28	13	ED,CO	Lewengrub, J. & Kirby, T. Ocean Institute	SMB5, BNFC, STY X, INMD, CRGN	Smear slide sediment for Education	2

Date

Samples Type

Investigator

Expeditions

Purpose

Visitors

Scripps Institution of Oceanography Geological Collections

Education Programs

2002 Sep 30	0	ED	Dubois, L. Palomar College	ALL	Facility tour and marine geology discussion	125
2002 Oct 07	1	ED,CO	Yasuda, M. SIO	CRGN	Education sampling	1
2002 Oct 31	0	ED	Adler, D. Aquarium, SIO	ALL	Facility tour and marine geology discussion	160
2002 Nov 01	9	ED,DR	Bergman, S. Univ Texas, Dallas	NOVA, MARA, RAMA	Ed samples from trenches	0
2002 Nov 07	4	ED,CO	Yasuda, M. SIO	INMD	Foram and pteropod study	1
2002 Nov 13	0	ED	Garrison, T. Orange Coast College	ALL	Facility tour and marine geology discussion	20
2002 Nov 22	2	ED	Miller, S.P. SIO	ALL	Facility tour and marine geology discussion	5
2002 Dec 10	0	ED	Dubois, L. Palomar College	ALL	Facility tour and marine geology discussion	120
2003 Jan 10	5	ED,CO,DR	Berger, W. SIO	CHEP, INMD, PLDS, SUC, SDAG	Education	2
2003 Feb 20	15	ED,CO	Paytan, A. Stanford	ALL	Facility tour and marine geology discussion	12
2003 Feb 26	12	ED	Driscoll, N. SIO	ALL	Facility tour and marine geology discussion	15
2003 Mar 10	0	ED	Adler, D. Aquarium, SIO	ALL	Facility tour/discussion for instructors	8
2003 May 15	0	ED	Adler, D. Aquarium, SIO	ALL	Facility tour and marine geology discussion	125
2003 Jun 02	0	ED	DuBois, L. Palomar College	ALL	Facility tour and marine geology discussion	14
2003 Jun 06	4	ED	Miller, P. Chacha Oceanview Jr. Highschool	CHEP	Educational samples provided	0
2003 Jun 26	0	ED	Glenn-Lee, S. Aquarium, SIO	ALL	Facility tour and marine geology discussion	9
2003 Sep 16	0	ED	Winter, P. S.D. Science ALL iance	ALL	Inclusion of SIO Geological Collections reference in Teachers' Resource publication.	0
2003 Sep 26	4	ED	Perez, E. Indiana State Univ.	ALL	Educational tour and geology discussion, 3 students.	3
2003 Oct 03	0	ED	Dubois, L. Palomar College	ALL	Education tour and discussion	75
2003 Oct 31	2	ED	Hilton, D. SIO	CHEPR, STYX	Educational samples for undergrad class at UCSD.	1
2003 Dec 10	0	ED	Gray, S. USD	ALL	Tour and marine geology discussion	20
Sample Sum:	554				Visitors:	2387

Date Samples Type Investigator Expeditions Purpose Visitors

Publications based on SIO Geological Collections material, 1995 –2003.

Boyle, E.A., Labeyrie, L. and Duplessy, J.-C., 1995. Calcitic foraminiferal data confirmed by cadmium in aragonitic *Hoeglundina*: application to the last glacial maximum in the northern Indian Ocean. *Paleoceanography*, 10(5): 881-900.

Burke, S.K., Dunbar, R.B. and Berger, W.H., 1995. Benthic and pelagic foraminifera of the *Macoma* layer, Santa Barbara Basin. *Journal of Foraminiferal Research*, 25(2): 117-133.

Haslett, S.K., 1995. Mapping Holocene upwelling in the eastern equatorial Pacific using Radiolaria. *The Holocene*, 5(4): 470-478.

Hawkins, J.W., Jr., 1995. The geology of the Lau Basin. In: B. Taylor (Editor), *Backarc Basins: Tectonics and Magmatism*. Plenum Press, New York, . 63-138.

Kim, D.S. and Kastner, M., 1995. C14 Dating results, Beta Analytic, Inc., Miami.

Martin, E.E., Macdougall, J.D., Herbert, T.D., Paytan, A. and Kastner, M., 1995. Strontium and neodymium isotopic analyses of marine barite separates. *Geochimica et Cosmochimica Acta*, 59(7): 1353-1361.

Rea, D.K. and Hovan, S.A., 1995. Grain size distribution and depositional processes of the mineral component of abyssal sediments: Lessons from the North Pacific. *Paleoceanography*, 10(2): 251-258.

Tauxe, L., Pick, T. and Kok, Y.S., 1995. Relative paleointensity in sediments: a pseudo-Thellier approach. *Geophysical Research Letters*, 22(21): 2885-2888.

Zuleger, E., Geiskes, J.M. and You, C.-F., 1995. Sediment cores on the Costa Rica Accretionary Prism (Atlantis II Cruise 131-10): Pore water studies. *S.I.O. Reference Series*, 95(4): 1-75.

Archer, D.E., 1996. An atlas of the distribution of calcium carbonate in sediments of the deep sea. *Global Biogeochemical Cycles*, 10(1): 159-174.

Batiza, R. et al., 1996. Steady and non-steady state magma chambers below the East Pacific Rise. *Geophysical Research Letters*, 23(3): 221-224.

Berger, W.H., Bickert, T., Yasuda, M.K. and Wefer, G., 1996. Reconstruction of atmospheric CO₂ from ice-core data and the deep-sea record of Ontong Java plateau: the Milankovitch chron. *Geol. Rundsch.*, 85: 466-495.

Berger, W.H. and Wefer, G., 1996. Expeditions into the past: paleoceanographic studies in the South Atlantic. In: G. Wefer, W.H. Berger, G. Siedler and D.J. Webb (Editors), *The South Atlantic: Present and Past Circulation*. Springer-Verlag, Berlin Heidelberg, . 363-410.

Grimm, K.A., Lange, C.B. and Gill, A.S., 1996. Biological forcing of hemipelagic sedimentary laminae: evidence from ODP Site 893, Santa Barbara Basin, California. *Journal of Sedimentary Research*, 66(3): 613-614.

Lange, C.B., Schimmelmann, A., Yasuda, M. and Berger, W.H., 1996. Marine Varves off Southern California. SIO Reference Number 96-22.

Loubere, P., 1996. The surface ocean productivity and bottom water oxygen signals in deep water benthic foraminiferal assemblages. *Marine Micropaleontology*, 28: 247-261.

Schwarz, B., Mangini, A. and Segl, M., 1996. Geochemistry of a piston core from Ontong Java Plateau (western equatorial Pacific): evidence for sediment redistribution and changes in paleoproductivity. *Geol. Rundsch.*, 85: 536-545.

Stott, L.D. and Tang, C.M., 1996. Reassessment of foraminiferal-based tropical sea surface $\delta^{18}\text{O}$ paleotemperatures. *Paleoceanography*, 11(1): 37-56.

Tauxe, L., Herbert, T., Shackleton, N.J. and Kok, Y.S., 1996. Astronomical calibration of the Matuyama-Brunhes boundary: Consequences for magnetic remanence acquisition in marine carbonates and the Asian loess sequences. *Earth and Planetary Science Letters*, 140: 133-146.

Zuleger, E., Gieskes, J.M. and You, C.-F., 1996. Interstitial water chemistry of sediments of the Costa Rica accretionary complex off the Nicoya Peninsula. *Geophysical Research Letters*, 23: 899-902.

Wei, W., 1996. Clarification of an Index Nannofossil Species for the Paleocene/Eocene Boundary. *Journal of Paleontology*, 70: 526-529.

Wei, W. and Zhong, S., 1996. Taxonomy and magnetobiochronology of *Tribrahiatus* and *Rhomboaster*, two genera of calcareous nannofossils. *Journal of Paleontology*, 70(1): 7-22.

Bollmann, J., 1997. Morphology and biogeography of *Geophyrocapsa* coccoliths in Holocene sediments. *Marine Micropaleontology*, 29: 319-350.

Martinez, J.I., De Decker, P. and Chivas, A.R., 1997. New estimates for salinity changes in the Western Pacific Warm Pool during the Last Glacial Maximum: oxygen-isotope evidence. *Marine Micropaleontology*, 32: 311-340.

Zhou, W., Van der Voo, R. and Peacor, D.R., 1997. Single-domain and superparamagnetic titanomagnetite with variable Ti content in young ocean-floor basalts: No evidence for rapid alteration. *Earth and Planetary Science Letters*, 150: 353-362.

Castillo, P.R., Natland, J.H., Niu, Y. and Lonsdale, P.F., 1998. Sr, Nd and Pb isotopic variation along the Pacific-Antarctic rise crest, 53-57°S: Implications for the composition and dynamics of the South Pacific upper mantle. *Earth and Planetary Science Letters*, 154: 109-125.

Herbert, T.D. et al., 1998. Depth and seasonality of alkenone production along the California margin inferred from a core top transect. *Paleoceanography*, 13(3): 263-271.

Higginson, M., Yasuda, M., Perks, H. and Burke, S., 1998. Data Summary. Property of University of Bristol.

Karsten, J.L. et al., 1998. The Northern Chile Ridge Spreading Center Revealed: New Results from the 1998 PANORAMA Leg 4 Expedition. *EOS*, 79(45, November 10, 1998 / Supplement): F45.

Karsten, J.L., Milman, M.S. and Klein, E.M., 1998. Petrogenesis of Northern Chile Ridge/Valdivia Fracture Zone Lavas: Major Element Constraints from the PANORAMA Leg 4 Expedition. *EOS*, 79(45): F836.

Loubere, P., 1998. The impact of seasonality on the benthos as reflected in the assemblages of deep-sea foraminifera. *Deep Sea Research*, 1(45): 409-432.

Martinez, F., Karsten, J.L. and Klein, E.M., 1998. Recent Kinematics and Tectonics of the Chile Ridge. EOS, 79(45): F836.

Mühe, R., Karsten, J.L. and Stoffers, P., 1998. Greenstones from the Northern Chile Ridge, SE-Pacific: First results from the PANORAMA Leg 04 cruise. EOS, 79(45): F836.

Schuffert, J.D., Kastner, M. and Jahnke, R.A., 1998. Carbon and phosphorus burial associated with modern phosphorite formation. Marine Geology, 146: 21-31.

Sturm, M.E., Klein, E.M., Karsten, J.L. and Martinez, F., 1998. Trace Element Variations in Axial Lavas from the Central Chile Ridge: Results from the 1998 Panorama 4 Expedition. EOS, 79(45): F836.

Trego, K.D., 1998. An offshore habitat for an Easter Island bivalve. Journal of Conchology, 36(1): 81.

Zhu, P. and Macdougall, J.D., 1998. Calcium isotopes in the marine environment and the oceanic calcium cycle. Geochimica et Cosmochimica Acta, 62(10): 1691-1698.

Aubry, M.-P. et al., 1999. The upper Paleocene-lower Eocene San Francisco de Paula section: Biostratigraphic synthesis. Micropaleontology, 45(supplement 2): 83-87.

Dowsett, H.J. and Poore, R.Z., 1999. Last Interglacial Sea-Surface Temperature Estimates from the California Margin: Improvements to the Modern Analog Technique. USGS Bulletin, 2171: 9.

Loubere, P. and Fariduddin, M., 1999. Quantitative estimation of global patterns of surface ocean biological productivity and its seasonal variation on timescales from centuries to millennia. Global Biogeochemical Cycles, 13(1): 115-113.

Karsten, J.L. et al., 1999. The Northern Chile Ridge Revealed: Preliminary Cruise Report of PANORAMA Expedition Leg 04. InterRidge Newsletter, 8(1): 15-21.

Perks, H., 1999. Climatic and oceanographic controls on the burial and preservation of organic matter in equatorial Pacific deep-sea sediments. Ph.D. Thesis, University of California, San Diego, La Jolla, 110.

Sanfilippo, A. and Hull, D.M., 1999. Upper Paleocene-lower Eocene radiolarian biostratigraphy of the San Francisco de Paula section, western Cuba. *Micropaleontology*, 45(sup. 2): 57-82.

Fisher, A.T. et al., 2000. Heat flow, sediment and pore fluid chemistry, and hydrothermal circulation on the east flank of Alarcon Ridge, Gulf of California. *Earth and Planetary Science Letters*, 188 (3-4): 521-534.

Hein, J.R. et al., 2000. Cobalt-rich ferromanganese crusts in the Pacific. In: D.S. Cronan (Editor), *Handbook of Marine Mineral Deposits*. CRC Press, Boca Raton, Florida, . 239-279.

Janney, P.E., le Roex, A.P. and Carlson, R.W., 2000. Hf isotope systematics of the central Southwest Indian Ridge. *EOS*, 81: F1128.

Janney, P.E., Macdougall, J.D., Natland, J.H. and Lynch, M.A., 2000. Geochemical evidence from the Pukapuka volcanic ridge system for a shallow enriched mantle domain beneath the South Pacific Superswell. *Earth and Planetary Science Letters*, 181: 47-60.

Regelous, M., Hofmann, A.W., Abouchami, W. and Galer, S.J.G., 2000. The geochemical evolution of Hawaiian magmatism since the Mesozoic: evidence from lavas from the Emperor Seamounts, Goldschmidt Conference. Cambridge Publications, Oxford, UK, . 832.

Dong, W., Lal, D., Ransom, B., Berger, W. and Caffee, M.W., 2001. Marine biogeochemistries of Be and Al: A study based on cosmogenic ^{10}Be , Be and Al in marine calcite, aragonite and opal. *Proc. Indian Acad. Sci. (Earth Planet. Sci.)*, 110(2): 95-102.

Herbert, T.D. et al., 2001. Collapse of the California Current During Glacial Maxima Linked to Climate Change on Land. *Science*, 293: 71-76.

Naar, D. et al., 2001. RAPA NUI 2001 Cruise Report for Leg 6 of the Drift Expedition Aboard the R/V Revelle Operated by Scripps Institution of Oceanography; Title of NSF Project: Assessing Hotspot Fixity in the Pacific Basin, <http://www.soest.hawaii.edu/pwessel/drft06rr/drft06rr.report.html>, . 14.

van Beek, P., 2001. Utilisation de la barytine sédimentaire marine pour les études paléocéanographiques de l'Holocène, Ph.D. Thesis, Université de Paris VI, France, 167pp.

Frank, M., Whitely, N., Kasten, S., Hein, J.R. and O'Nions, K., 2002. North Atlantic Deep Water export to the Southern Ocean over the past 14Myr: Evidence from Nd and Pb isotopes in ferromanganese crusts. *Paleoceanography*, 17(2): 12-1 through 12-9.

York, A., 2002. The Geoarchaeology of San Diego's Inner Continental Shelf: Environmental Reconstruction and Potential for Prehistoric Site Preservation, Pacific Coast Archaeological Society Meeting, Irvine, CA.

Zou, H., Zindler, A., Niu, Y., 2002. Constraints on Melt Movement Beneath the East Pacific Rise From ^{230}Th - ^{238}U Disequilibrium. *Science*, 295: 107-110.

Hein, J.R., Koschinsky, A. and Halliday, A.N., 2003. Global occurrence of tellurium-rich ferromanganese crusts and a model for the enrichment of tellurium. *Geochimica et Cosmochimica Acta*, 67(6): 1117-1127.

Sanfilippo, A., Hakyemez, A. and Tekin, U.K., 2003. Biostratigraphy of late Paleocene-Middle Eocene radiolarians and foraminifera from Cyprus. *Micropaleontology*, 49(1): 47-64.

van Beek, P., Reyss, J.-L., Bonte, P., Schmidt S., 2003. Sr/Ba in barite : a proxy of barite preservation in marine sediments ?, *Marine Geology* 199, 205-220.

van Beek, P., Reyss, J.-L., DeMaster, D., Paterne, M., 2004. ^{226}Ra -in marine barite: Relationship with carbonate dissolution and sediment focusing in the equatorial Pacific, *Deep-Sea Research I* 51, 235-261.